Estimating The Insulation Strength Of Two Series Non-Ceramicdielectrics On Distribution Systems: A Statistical Approach

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Summary

Distribution lines are spanned on a much larger area as compared to transmission lines and, therefore, are more often susceptible to lightning strokes. On the other hand, over-estimated insulating materials always lead to more cost. The selection of the proper value of the basic insulation level (BIL) for particular insulation components of distribution structures is the task of the system/distribution engineer and is referred to as insulation coordination. A method of estimating the critical flashover (CFO) of the insulation strength of two nonceramic components in series used on distribution overhead lines is presented. A multiple regression technique (MRT) has been applied to a CFO data of two nonceramic dielectric materials in series, models are developed, and also general estimation models for ceramic insulator (porcelain) plus wood or nonceramic insulator (polymers and/or fiber reinforced plastics) using MRT. Comparison of the nonceramic model to other developed models are discussed, and suggestions are made regarding more accurate prediction techniques with a given number of factors that might affect experimental results. Also, procedures to predict values outside of the experimental results range are described for optimum insulation strength added to distribution systems by nonceramic dielectrics